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Implementation of Regional Sediment Management through Dredged Material Management Planning

by William Aley

PURPOSE. This Coastal and Hydraulics Engineering Technical Note (CHETN) provides an understanding of the methodology used by Jacksonville Harbor, FL to incorporate the philosophy of Regional Sediment Management (RSM) into the Harbor's Dredged Material Management Plan (DMMP). Since RSM begins at the local level, the DMMP provides great insight for disposal opportunities such as near-shore, offshore, or confined placement with maximum environmental considerations. These optimum beneficial uses result from close coordination between the Operations Division and Planning Division of the US Army Engineer District, Jacksonville, FL (SAJ), and Jacksonville Harbor.

INTRODUCTION. The US Army Corps of Engineers (USACE) is directed to conduct Dredged Material Management Planning pursuant to existing authorities for individual navigation projects and feasibility studies. RSM ideals are gaining popularity due to increasing disposal costs, and as part of the USACE's requirement to assess potential beneficial uses of dredged material per Engineer Regulation 1105-2-100 (US Army Corps of Engineers 2000).

Various authorities and sources of funding exist for developing regional sediment management strategies or implementing RSM practices. A number of Civil Works policy and guidance documents encourage and support regional or comprehensive approaches that consider projects, problem solving, and management in the context of broader (regional) systems. These policies and procedures are primarily defined in the following Engineering Manual (EM), Engineer Regulation (ER), and Engineering Circular (EC) that are published at Headquarters, US Army Corps of Engineers:

- Engineer Manual EM 1110-2-5027: Confined Disposal of Dredged Material (US Army Corps of Engineers 1987)
- Engineer Regulation ER 1105-2-100: Planning Guidance Notebook, Dredged Material Management Plans (US Army Corps of Engineers 2000)
- Engineer Circular EC 1105-2-411: Watershed Plans (US Army Corps of Engineers 2010)

In FY 2011, SAJ was supported through the National RSM Program to facilitate coordination between the SAJ Planning Division and Operations Division to develop language that can be included in dredged material management planning Project Management Plans (PMPs) to integrate the RSM philosophy into standard business practices. As a result of this process it was found that RSM ideals can be easily disseminated through the Project Delivery Team (PDT), can be directly incorporated into DMMPs, and can drive the plan formulation process when developing new dredged material disposal alternatives. A DMMP has proven to be the ideal forum to initiate environmental coordination of RSM opportunities such as near-shore disposal, existing disposal area placement, and sediment recycling. Many valuable insights have been made by the Jacksonville Harbor Operations and Maintenance (O&M) DMMP PDT regarding typical sediment man-

agement practices that can be implemented on a local scale by the USACE and project sponsors that will support future RSM. Particularly, active and planned management of existing disposal areas in accordance with EM 1110-2-5027 during and between disposal events will ensure efficient operation of existing upland disposal areas, thereby supporting future RSM opportunities. Opportunities for incorporating RSM directly into the plan formulation process were also realized. Recommendations pertaining to specific language and policies to assist in incorporation of RSM philosophy into future DMMPs have been developed.

JACKSONVILLE HARBOR O&M DMMP. In 2011, SAJ updated the O&M DMMP for Jacksonville Harbor. Since all existing upland disposal facilities for Jacksonville Harbor are nearing capacity, the USACE and the project sponsor (Jacksonville Port Authority) are relying heavily on incorporation of RSM principals into the updated DMMP for several reasons. The primary reason is to maximize the life and use of all existing upland disposal facilities. Another major reason is to aid in formulating a least-cost base plan which optimizes use of sediments for future disposal of O&M dredged material. Through this process, the Jacksonville Harbor O&M DMMP PDT has realized that several opportunities exist for incorporating RSM principals directly into the management plan. Many of these opportunities may be directly implemented by Operations Division team members while others can be implemented through Planning Division.

SAJ OPERATIONS DIVISION AND RSM. USACE Operations Divisions play a major role in implementing RSM. The PDT has determined that, before formulating new disposal options or updating DMMPs, there are many RSM-related activities that can be carried out to ensure efficient and forward-looking disposal area management. Through the development of the Jacksonville Harbor O&M DMMP, SAJ understands that RSM starts with local sediment management at various scales. As existing disposal areas reach capacity, and as disposal costs per cubic yard continue to rise, the USACE and sponsors are becoming more aware of the need for active management and maintenance of existing dredged material management areas.

Because of the large temporal and spatial scales of typical harbor dredging operations, and the large size of typical upland disposal areas, there may be a tendency to under-emphasize accurate tracking of individual disposal events, or to minimize management of disposal sites during early years when there is an apparent excess of disposal capacity. As time goes by and disposal sites near capacity, the importance of accurate record-keeping and ongoing management and maintenance of these sites becomes more relevant.

SAJ Operations Division has cited the Dredging Information System (DIS) as a very useful tool for organizing information about specific disposal events that can be easily accessed. Operations Divisions are required to update the DIS for each project as dredging events occur. However, information related to many projects may or may not always be up-to-date in DIS. Specifically, records from DIS have been useful for developing shoaling estimates and forecasting potential future dredging schedules. Shoaling estimates and dredging forecasts are the cornerstone of DMMPs because every other aspect of the plan is formulated around these quantities and schedules.

Recent experiences at SAJ have also reinforced the importance and applicability of many of the principals outlined in EM 1110-2-5027, Confined Disposal of Dredged Material (US Army Corps of Engineers 1987). This Engineering Manual provides valuable guidance for planning, designing, constructing, operating, and managing confined dredged material disposal sites. All USACE dis-

posal operations should be conducted in accordance with its recommended methods. Specific areas of interest in this manual are the sections on containment area design, operation and management, dewatering, consolidation, densification of dredged material, and long-term capacity and management methods. If these techniques are implemented as described, then RSM opportunities will be maximized. All team members involved in planning, designing, constructing, operating, and managing confined disposal sites should be familiar with the principals and recommendations outlined in this EM. Recommendations and specific procedures outlined in this EM should be directly written into planning documents, plans and specifications, and anywhere that Dredged Material Management Area (DMMA) operating procedures are defined. Implementation of these techniques is essential if disposal facilities are to be operated as efficiently as possible.

SAJ PLANNING DIVISION AND RSM. USACE Planners also play a major role in implementing RSM practices at Corps projects. With the assistance of other PDT members, Planners have the ability to formulate and recommend dredged material management plans that may incorporate various degrees of RSM principals. Whether it is an operational change such as initiation of beach and near-shore disposal, or implementation of a large structural alternative such as construction of an entirely new disposal area, RSM can be integrated into plan formulation by incorporating RSM language and references into the body of the DMMPs. RSM principals should be defined in the introduction, scope, and early sections of planning studies. Specifically, RSM terms and principals should be used when defining study-specific problems, opportunities, objectives, and constraints. If this is done, then the plan formulation process will be guided by RSM principals. To ensure an RSM mindset, the Jacksonville Harbor O&M DMMP includes the following opportunities and objectives:

- Opportunities:
 - Enact management measures to maximize efficient use of current disposal areas.
 - Re-engage in beneficial use opportunities at Buck Island DMMA (offloading).
 - Pursue alternative disposal methods and maximize beneficial use of all suitable dredged material.
- Objectives:
 - Provide 20 years of dredged material disposal capacity for Jacksonville Harbor operations and maintenance activities.
 - Maximize beneficial use and reuse opportunities for dredged material from Jacksonville Harbor operations and maintenance.
 - Maximize efficient use of existing confined disposal facilities.

Another way SAJ is incorporating the RSM philosophy into DMMPs is by identifying and defining the general quality, quantity, and location of dredged material in relation to the type of disposal method that can be considered. This is useful when comparing various alternative disposal methods for various sections of the harbor. In Jacksonville Harbor, all O&M dredged material falls into one of the following three categories:

- **Suitable.** Material that is construction grade quality: Would be suitable for beneficial reuse by the construction industry and/or beach or near-shore disposal.

- **Unsuitable.** Material that is not construction grade quality: Has too many fines (>20%) for beach or near-shore disposal, but may be acceptable for Offshore Dredged Material Disposal Site (ODMDS) placement.
- **Confined disposal only.** Material that can ONLY be disposed in an upland DMMA: Has too many fines for beach or near-shore disposal, and would not pass bioassays for ODMDS disposal. Also includes material that may potentially contain environmental contaminants.

Additionally, other Federal and USACE guidelines, policies, and principals that support RSM should be reiterated in planning documents. USACE Environmental Operating Principles (US Army Corps of Engineers 2002) (specifically Principles 1, 2, and 3) are directly relevant to dredged material planning and management, and contain language supporting RSM that can be cited in planning reports. EC 1105-2-411, Watershed Plans (US Army Corps of Engineers 2010), describes how the Corps has renewed its emphasis on taking a more comprehensive view of project planning, instead of primarily focusing on single purpose projects. Thus, the Corps recognized the need to undertake planning in a broader, integrated, systems context.

- USACE Environmental Operating Principals:
 1. Strive to achieve environmental sustainability. An environment maintained in a healthy, diverse, and sustainable condition is necessary to support life.
 2. Recognize the interdependence of life and the physical environment, and consider environmental consequences of Corps programs and activities in all appropriate circumstances.
 3. Seek balance and synergy among human development activities and natural systems by designing economic and environmental solutions that support and reinforce one another.
- EC 1105-2-411, Watershed Plans: These ideals are very similar to those of RSM. This EC strives to achieve integrated water resources planning, and recognizes the need to undertake planning in a broad, integrated, systems context rather than in a site- or project-specific context.

CONCLUSIONS. There are many opportunities for integrating the RSM philosophy into the USACE standard business practices through Dredged Material Management Planning. With this in mind, the importance of coordination between Operations Division and Planning Division is stressed. RSM specific language and references should be built into the introduction, scope, opportunities, and objectives sections of DMMPs. It has also been made apparent that regional sediment management starts at the local scale. RSM opportunities will be maximized when dredged material disposal events are conducted based on standard practices as outlined in EM 1110-2-5027 (US Army Corps of Engineers 1987). Record keeping and information management are also extremely important for developing accurate plans. The USACE Dredging Information System is a very helpful record-keeping tool that should be used for these purposes. A DMMP is also a forum to initiate environmental coordination for RSM opportunities such as near-shore disposal, disposal area offloading, and sediment recycling.

ADDITIONAL INFORMATION. This Coastal and Hydraulics Engineering Technical Note (CHETN) was written by William Aley, US Army Engineer District, Jacksonville, FL (SAJ), and describes an effort funded by the USACE Regional Sediment Management (RSM) program to facilitate coordination between SAJ Planning Division and Operations Division to integrate RSM philosophy into DMMP Project Management Plans. Additional information pertaining to the RSM program can be found at the RSM web site <http://rsm.usace.army.mil>

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ACRONYMS AND ABBREVIATIONS.

Term	Definition
CHETN	Coastal and Hydraulics Engineering Technical Note
CHL	Coastal and Hydraulics Laboratory
DMMA	Dredged Material Management Area (DMMA)
DMMP	Dredged Material Management Plan
EC	Engineer Circular
EM	Engineer Manual
ER	Engineer Regulation
ERDC	Engineer Research and Development Center
FY	fiscal year
HQUSACE	Headquarters, US Army Corps of Engineers
O&M	Operations and Maintenance
ODMDS	Offshore Dredged Material Disposal Site
PDT	Project Delivery Team
RSM	Regional Sediment Management
SAJ	US Army Corps of Engineers South Atlantic Division, Jacksonville District
USACE	US Army Corps of Engineers

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